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Can Fracking Pollute Drinking Water? Don't Ask the EPA

The EPA has been unable to collect the data it needs from the multibillion dollar oil and gas sector, which has stymied a five-year federal study.

By Neela Banerjee, InsideClimate News

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When a draft of the EPA's long-awaited fracking water study is released this spring, the agency may still be unable to provide a definitive answer to the question of whether fracking pollutes drinking water. That's because the study won't have baseline comparisons of water chemistry before and after fracking due to opposition from industry. Credit: A hydraulic fracturing operation in Pinedale, Wyo./Ecoflight

Can fracking pollute drinking water?

The Environmental Protection Agency embarked in 2010 on what was intended to be a definitive study to find out. The answer could prove critical to future U.S. regulation of the multibillion-dollar fossil fuel sector and to ensuring water safety for millions of Americans.

But after five years of fighting with the oil and gas industry, the agency may still be unable to provide a clear answer when a draft of the study is published this spring, based on internal EPA documents and interviews with people who have knowledge of the study.

"We won't know anything more in terms of real data than we did five years ago," said Geoffrey Thyne, a geochemist and a member of the EPA's 2011 Science Advisory Board, a group of independent scientists who reviewed the draft plan of the study. "This was supposed to be the gold standard. But they went through a long bureaucratic process of trying to develop a study that is not going to produce a meaningful result."

More than a half-dozen former high-ranking EPA, administration and congressional staff members echoed Thyne's opinion, as did scientists and environmentalists. Nearly all the former government employees asked not to be identified because of ongoing dealings with government and industry. Two hundred pages of EPA emails and other documents about the study point to the same conclusions. The documents were acquired by Greenpeace under the Freedom of Information Act and shared with InsideClimate News.

The EPA's failure to answer the study's central question partly reflects the agency's weakness relative to the politically potent fossil fuel industry. The industry balked at the scope of the study and sowed doubts about the EPA's ability to deliver definitive findings. In addition, concerns about the safety of drinking water conflicted with the Obama administration's need to spur the economy out of recession while expanding domestic energy production.

For the study's findings to be definitive, the EPA needed prospective, or baseline, studies. Scientists consider prospective water studies essential because they provide chemical snapshots of water immediately before and after fracking and then for a year or two afterward. This would be the most reliable way to determine whether oil and gas development contaminates surface water and nearby aquifers, and the findings could highlight industry practices that protect water. In other studies that found toxic chemicals or hydrocarbons in water wells, the industry argued that the substances were present before oil and gas development began.

Prospective studies were included in the EPA project's final plan in 2010 and were still described as a possibility in a December 2012 progress report to Congress. But the EPA couldn't legally force cooperation by oil and gas companies, almost all of which refused when the agency tried to persuade them.

The abortive attempt to conduct prospective studies serves as "a microcosm of the relationship between industry and EPA," said a former senior EPA official involved in fracking issues.

Over the past 35 years, Congress has passed laws exempting the oil and gas industry from many environmental rules, including parts of the Clean Air Act and the Resource Conservation and Recovery Act, which governs hazardous waste. In 2005, upon the recommendation of Vice President Dick Cheney's energy task force, Congress exempted fracking fluids, except for the underground injection of diesel, from the Safe Drinking Water Act. This measure is known as the "Halliburton loophole," a reference to the oilfield services giant once led by Cheney.

Eventually, two companies agreed to participate in the prospective studies, though ultimately the collaborations fell through. One of them, Chesapeake Energy, chipped away at the scope of the plan over two years of talks, limiting when and where the EPA could monitor water, the EPA documents show. EPA officials and scientists offered Chesapeake considerable influence over the process in some instances.

For example, when one site fell through after a year of talks, the EPA and Chesapeake jointly drafted talking points to use with the media, according to EPA emails.

By 2012, as President Barack Obama was campaigning for reelection, a public, confrontational approach to the fracking water study was out of the question, according to former EPA officials.

"While all this was going on, the president was talking about the virtues of natural gas," said one former EPA official close to the work. "The nation's energy policy was shifting, and that fuel source was the basis of it. The president was very gung-ho on it."

The White House did not respond to a request for comment. Dan Whitten, a spokesman for America's Natural Gas Alliance, said the EPA has the best perspective on why the prospective studies fizzled.

After three years looking for suitable locations for baseline research, the EPA determined it had to move on or risk further delays to the overall study. Originally due in 2012, the final study is now expected in 2016 after the completion of reviews. The project is expected to cost \$29 million, more than double the initial budget of \$12 million. A draft version will be made public this spring when it goes to the Science Advisory Board, the EPA said in January.

"Despite our efforts, we were unable to find a location and determine a timeline to meet the [study] criteria and that also worked for Chesapeake," said EPA spokeswoman Liz Purchia in a written Feb. 13 statement. "However, from a scientific point of view and working with the budget Congress gave us, we have been gathering the data necessary to best answer the scientific questions that were posed in the hydraulic fracturing study."

A Brief History

The oil and gas boom, ranging from North Dakota to Pennsylvania, took off as Obama began his first term in 2009. Quickly, the administration came to see the rush as an advantage. While the economy dragged, fossil fuel development created jobs, which the president often mentioned. Cheap natural gas came to be seen as a substitute for coal in generating electricity as the EPA moved to reduce airborne pollutants such as mercury, arsenic and, more recently, carbon dioxide.

At the same time, a backlash was brewing. The increased oil and gas production comes from high-volume hydraulic fracturing, which entails the underground injection at high pressure of millions of gallons of water laced with sand and chemicals to crack rock formations containing hydrocarbons. As fracking grew more widespread, high-profile cases of water contamination generated fears of a link between the two. In 2008, the EPA began sampling well water in Pavillion, Wyo., because of residents' complaints. In 2009, families in Dimock, Pa., filed a federal lawsuit against an oil and gas company for allegedly contaminating their well water with methane, the main component of natural gas. In 2010, the film "Gasland" contained footage of people near fracking sites who set their well water on fire.

"We were getting our asses kicked in the natural gas debate. The story was not playing well with the public," said a former senior EPA official. "If we want to move off a reliance on coal, we have to do something. Natural gas is a good transitional fuel. We need to ensure that there aren't unmanageable problems with increased production."

When the Democratic-controlled House Appropriations Committee urged the EPA to conduct the water study in March 2010, the agency seized on the idea. At first, hopes were lofty.

"There is every opportunity for this study to clarify and give knowledge and insight about the [fracking] operations so that the American people can be confident that their drinking water is pure and uncontaminated," said Paul Anastas, then-director of the EPA's Office of Research and Development, which ran the study, at a [congressional hearing in May 2011](#).

Industry Pushes Back

The EPA designed the water study around these elements:

- Analysis of data from companies about the ingredients in fracking fluids, fracking procedures and the health effects of fracking chemicals.
- Computer modeling to understand whether fracking could contaminate water.
- Laboratory studies of how fracking fluids might create new compounds in geological formations.
- Toxicology assessments of fracking fluids.
- Case studies, including retrospective research that would examine cases of reported water contamination at fracked sites.
- Prospective, or baseline, studies in places where fracking had not yet happened.

When reviewing the plan, some members of the 2011 Science Advisory Board suggested the EPA focus on a smaller range of research activities, in particular the prospective studies, given its budget and tight timetable.

"The single most important thing you could do is prospective studies for a year or two at a few wells," said Thyne, the board member.

Those comments didn't make it into the final draft of the study plan, and the EPA proceeded with its sweeping effort. The industry at first reacted cautiously. But in 2011, control of the House of Representatives flipped to Republicans friendly to oil and gas. Suddenly, the industry had an audience open to its concerns about the study, and it pushed back.

Groups such as the American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) contended the scope of the study was too broad. In its plan, the EPA took a "lifecycle" approach to water and fracking. That meant looking at the impact on surface water and aquifers at each step: the withdrawal of water from local sources, mixing chemicals and sand with it, injecting the fluid into the well during fracking, flowback up the well of fluid and wastewater, and the treatment and disposal of wastewater. The industry argued that "hydraulic fracturing" meant only the period of several weeks when the process is used at a well.

"It's inarguable that the scope of the study expanded beyond the narrow focus Congress had recommended," said Peter Robertson, the head lobbyist for ANGA in 2011 and 2012. "The question was, does the activity of injecting water, sand and a small amount of chemicals produce concerns about water? It wasn't about the rest of the process."

API and ANGA proposed that an outside consultant hired by the industry, the Battelle Memorial Institute, conduct "a collaborative, side by side study with EPA." The goal was for the industry to shadow the EPA during the study, rather than wait for the project to be peer-reviewed, when it might be too late to address disputes over methodology or results, Robertson said.

The EPA declined "because we felt it was important that we provide the public an independent analysis," said Purchia, the spokeswoman.

Battelle, a nonprofit research and development firm based in Columbus, Ohio, that also does water treatment for fracking activities in Ohio and Pennsylvania, published a report in mid-2012 commissioned by the industry that slammed the study design.

Still, the industry and the EPA remained optimistic about the baseline studies, said Robertson and former EPA officials. With retrospective studies, there's often a dispute between industry and regulators about whether anything actually happened at a site. With the prospective studies, the industry and the EPA would start together with a clean slate.

Chesapeake Is on Board—or Is It?

For prospective studies, the EPA needed companies to volunteer. But almost all of them refused, with the exception in 2010 of Chesapeake Energy.

The company was one of the country's biggest gas producers at the time. For more than two years, the EPA negotiated with Chesapeake to conduct prospective studies at its fracking sites. The first one under discussion was in the Haynesville shale of northwest Louisiana. EPA scientists wanted to sample water before the site was developed and drilled, after the well was constructed, before and after fracking occurred, and for a period while the well was producing gas, said Robert Puls, the head scientist for the Louisiana prospective study who is now retired from the EPA.

Chesapeake worked to narrow the study's focus to the few weeks of hydraulic fracturing only, the same position as taken by industry trade groups, according to a Quality Assurance report that the EPA prepared for the Louisiana site. Throughout the report, which is riddled with Chesapeake's edits and comments in the margins, the company insists that the "study should be focused on hydraulic fracturing."

The EPA and Chesapeake could not agree on where the agency could put monitoring wells to test groundwater. In the Haynesville Shale, the land is flat, so underground water moves slowly, perhaps a few inches a year compared with a few inches a day in other places, Puls said. That means any contaminants near the gas well would move very little in the course of a year. So the EPA asked to place a monitoring well on Chesapeake's well pad. The company refused to allow that well, or another that would be further away from the pad, Puls said.

"The process of trying to finalize a prospective study with Chesapeake was very, very difficult," Puls said. "Industry, I think, honestly did want to collaborate. At the same time, when I was there, we didn't see eye to eye on the full scope of the study. So because of that, there was a tug and pull on it, with us saying, 'We need to do this,' and them saying, 'We don't want to do that.'"

Chesapeake declined to comment.

The company started drilling at its Louisiana site before the terms of the prospective study were concluded, which meant that the EPA had to start from scratch elsewhere. The second time, at a new site in Oklahoma, the EPA gave Chesapeake what it wanted, the documents show.

In a May 2012 email to an EPA scientist on the Oklahoma study, Chesapeake's lead engineer on the effort, Chris Hill, wrote that based on an April talk, "EPA agrees with the timing (i.e. after well construction and pre-HF) of the installation of horizontal wells, if they are even necessary...EPA is willing to maintain a buffer of 30 ft. when installing the horizontal wells...EPA plans to include language in the final study plan regarding our concern and the limitations of horizontal monitoring wells."

Thirty minutes later, the EPA scientist responded, confirming that monitoring wells would be put in only after the well was drilled and that none would be close to the Chesapeake well.

The EPA also worked with Chesapeake to draft talking points to explain the shift of the baseline studies to Oklahoma from Louisiana. In an August 2012 email to John Satterfield, the company's director of environmental and regulatory affairs, lead EPA scientist Jeanne Briskin wrote that several months earlier she and one of Chesapeake's lobbyists drafted a text to "explain why we are changing locations. The attachment contains the language we agreed to at that time. Would you please review the proposed text to make sure that it still works for Chesapeake and let me know whether it is ok as is?"

The EPA's Purchia said the two sides developed talking points independently. "When we thought we were going to announce a prospective study with CHK [Chesapeake], we emailed them to ensure that we had the same understanding of the work that would be done before it was announced," she wrote in an email.

The results from the Oklahoma study were due in 2014, according to the talking points. Ultimately, the study never took place. It is unclear in the documents when or why talks between the EPA and Chesapeake ended. One reason may be the ouster by 2013 of much of Chesapeake's top management in a shareholder revolt over the financial practices of [Aubrey McClendon](#), the former chief executive officer.

"The industry's strategy, which is evident here, is one that has worked really well in the past: constraining the study and keeping it from having any teeth," said Jesse Coleman, a researcher at Greenpeace who requested and reviewed the documents. "Legally EPA couldn't demand companies do things. It all speaks to the influence that industry has over EPA."

In early 2012, the EPA entered into a "non-binding" agreement with Range Resources to participate in a prospective study, as part of deal to drop legal action against Range for allegedly contaminating homeowners' drinking water in Parker County, Texas, according to a 2013 EPA Inspector General report. That study also was not undertaken. The legal action was not reinstated.

Asked why the study fell through, Range spokesman Matt Pitzarella said: "We just didn't hear back" from the EPA.

Purchia said the two sides "could not come to agreement on the terms of access to the property."

At the same time the prospective studies crumbled, the EPA retreated from three high-profile investigations of alleged water contamination by oil and gas development. From 2008 to 2012, the EPA sampled water in [Dimock, Pa.](#); [Pavillion, Wyo.](#); and Parker County, Texas. In each case, it found evidence of contamination. Nonetheless, the EPA declined to pursue further water sampling or disciplinary action against the energy companies.

Environmentalists and critics among current and former EPA staff contend the administration gave in to political and industry pressure to shield natural gas development from scandal. None of the three sites is included in the fracking water study.

A year ago, the EPA Inspector General initiated a review of the EPA's and states' ability to prevent water pollution from hydraulic fracturing. The IG's office hopes to issue its report this spring, possibly in May, said Jennifer Kaplan, a spokeswoman.

A Different Outcome?

In the five years since the study's launch, academic research into fracking's effect on water has taken off and provided some answers that the EPA study was intended to find. For instance, Duke University researchers found in a June 2013 study that drinking-water wells in northeastern Pennsylvania within a kilometer of fracking had methane concentrations six times greater on average than wells farther away. A

July 2013 study by scientists from the [University of Texas-Arlington](#) indicated that groundwater near fracking sites in Texas' Barnett Shale had higher levels of arsenic and other heavy metals.

Could the EPA have sidestepped oil and gas companies and asked homeowners' permission to monitor their well water near fracking sites, as academics did? No, according to Purchia. Groundwater moves slowly, and the EPA had planned to gather samples near fracking sites for a minimum "of four seasons," she wrote in an email. Therefore, the EPA needed to place monitoring wells as close as possible to oil and gas wells, which would have meant on company, rather than homeowner, property.

Though many environmentalists and even some former EPA staff are disappointed with the absence of prospective studies, most said that the broader project could provide some useful, if limited, information.

"Our expectations are low about getting anything conclusive about whether the risks with fracking are insurmountable or manageable," said Briana Mordick, a staff scientist with the Natural Resources Defense Council. "When the report comes out, each side will be able to say what they want about it. I don't think it will necessarily change the landscape."